UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/510,263	12/29/2004	Avner Badhei	66518-8002.US02	1621

22918 7590 08/24/2009

PERKINS COIE LLP
P.O. BOX 1208
SEATTLE, WA 98111-1208

EXAMINER	
KUO, WENSING W	
ART UNIT	**PAPER NUMBER**
2826	
MAIL DATE	**DELIVERY MODE**
08/24/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/510,263	BADHEI ET AL.	
	Examiner	Art Unit	
	W. Wendy Kuo	2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 June 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *173-201* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *173-201* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *06/17/2009; 06/26/2009*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 173-201 are pending.

Information Disclosure Statement

2. The information disclosure statement filed 06/17/2009 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication (International Search Report PCT/IL03/00308 dated 2 July 2004) or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 196, 198, 200, and 201 are rejected under 35 U.S.C. 102(b) as being anticipated by Tran et al. (US 6,115,521) (hereinafter Tran).

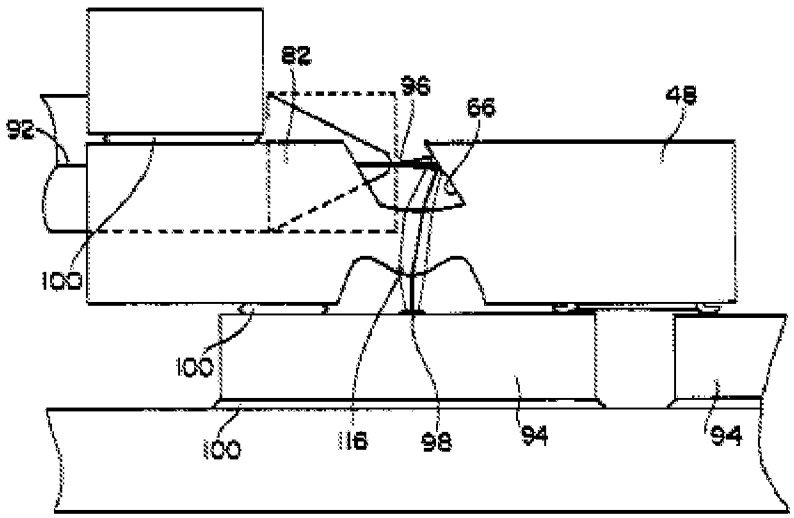

FIG. 7

With respect to claim 196, Tran (e.g. Figure 7; reproduced above) teaches an integrated circuit, comprising:

- A semiconductor substrate 48 (column 6, lines 41-46) having electrical circuitry (column 4, lines 53-60; column 10, lines 22-30) coupled to an optoelectronic device 94 disposed on a first surface (underside) of the semiconductor substrate 48, the semiconductor substrate having a notch (82 Figure 5N) extending from a second surface (topside) of the semiconductor substrate 48 towards the first surface;
- An optical fiber 92, having a core region (region of 96 within 92), mounted on the second surface (topside) of the semiconductor substrate 48;
- Wherein the notch extends through the core region of the optical fiber;
- An optical reflector assembly 66 disposed within the notch

With respect to claim 198, Tran (e.g. Figure 7) teaches that the optical reflector assembly 66 is physically configured for optical coupling with the core region of the optical fiber 92 (column 10, lines 32-44).

With respect to claim 200, Tran teaches that the optical reflector assembly comprises at least one curved mirror disposed on the substrate (column 5, lines 36-39; column 6, lines 58-64).

With respect to claim 201, Tran teaches that the optical reflector assembly further comprises a planar mirror disposed on the substrate (column 5, lines 36-39; column 6, lines 58-64).

Claim Rejections - 35 USC § 103

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 173-178, 180-186, and 192-195 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tran in view of Gruenwald et al. (US 5,987,202) (hereinafter Gruenwald).

With respect to claim 173, Tran (e.g. Figure 7) teaches an integrated circuit, comprising:

- A semiconductor substrate 48 (column 6, lines 41-46) having electrical circuitry (column 4, lines 53-60; column 10, lines 22-30) coupled to an optoelectronic device 94 disposed on a first surface (underside) of the semiconductor substrate 48, the semiconductor substrate having a notch (83 Figure 5N) extending from a second surface (topside) of the semiconductor substrate 48 towards the first surface;
- Wherein the notch at least partially overlaps with the optoelectronic device 94 on the first surface;
- An optical reflector assembly 66 disposed within the notch;
- Wherein, the optical reflector assembly 66 ***couples light*** 96 ***incident within the notch*** with the optoelectronic device 94 (column 10, lines 32-38)

Tran fails to teach that the optical reflector assembly is formed from a substrate. Gruenwald teaches that an optical reflector assembly is formed from a substrate (Pyrex glass body) (column 5, lines 35-39) in order to provide a method for economical production of optical high-frequency transmitting and receiving modules (column 2, lines 9-12 and 52-56) by providing a desired mirror contour and inclination (column 5, lines 20-45).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the integrated circuit of Tran with the optical reflector assembly of Gruenwald formed from a substrate for the benefit of providing a method for economical

production of optical high-frequency transmitting and receiving modules by providing a desired mirror contour and inclination.

With respect to claim 174, Tran (e.g. Figure 7) teaches an optical fiber 92 disposed on the second surface of the semiconductor substrate 48, the optical fiber having a core region (region of 96 within 92).

With respect to claim 175, Tran teaches that the optical reflector assembly 66 is physically configured for optical coupling with the core region of the optical fiber (column 10, lines 32-38).

With respect to claim 176, Tran teaches that the optoelectronic device is one of a laser, a vertical-cavity surface-emitting laser, a photodiode, a waveguide, an array waveguide grating, and an optical amplifier (column 5, lines 36-44).

With respect to claim 177, Tran teaches that the optoelectronic device is coupled to said semiconductor substrate via solderable bumps 100.

With respect to claim 178, Tran (e.g. Figure 7) teaches that the optoelectronic device is coupled to said semiconductor substrate via flip-chip mounting.

With respect to claim 180, Gruenwald teaches that the electrical circuitry comprises a metal trace to which the optoelectronic device is coupled (column 7, lines 44-56).

With respect to claim 181, Tran (e.g. Figure 7) teaches that the notch comprises an inclined surface; wherein, the inclined surface is inclined relative to the first surface and extends through at least the core region of the optical fiber.

With respect to claim 182, Tran teaches that the optical reflector assembly comprises at least one curved mirror disposed on the substrate (column 5, lines 36-39; column 6, lines 58-64).

With respect to claim 183, Tran teaches that the curved mirror is a spherical mirror (column 5, lines 36-42; Figure 7 of Gruenwald).

With respect to claim 184, Tran teaches that the optical reflector assembly further comprises a planar mirror disposed on the substrate (column 5, lines 36-39; column 6, lines 58-64).

With respect to claim 185, Gruenwald teaches that the substrate is a glass substrate (column 5, lines 35-39).

With respect to claim 186, Tran as modified by Gruenwald teaches that the optical reflector assembly is coupled to the notch at the at least one inclined surface via an optical adhesive attaching the glass substrate to the at least one inclined surface (Gruenwald column 3, lines 1-4).

With respect to claim 192, Tran teaches that the optoelectronic device is configured to operate with light of substantially the wavelength spectrum and the semiconductor substrate is absorbing for light of substantially the wavelength spectrum (column 4, lines 53-67).

With respect to claim 193, Tran (e.g. Figure 7) teaches that the semiconductor substrate 48 has at least one opening 116 between the first surface (underside) and the notch, the opening at least partially overlaps with the optoelectronic device 94.

With respect to claim 194, Tran teaches that the optical reflector assembly 66 is physically configured for optical coupling the core region of optical fiber 92 to the optoelectronic device (column 10, lines 32-38).

With respect to claim 195, Gruenwald teaches that the substrate comprises of one or more of glass, silicon, and ceramic (column 5, lines 35-39).

8. Claims 179 and 187-191 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tran as modified by Gruenwald in view of Reedy et al. (US 6,869,229) (hereinafter Reedy).

With respect to claim 179, Tran as modified by Gruenwald teaches all of the limitations of claim 173 above.

Tran as modified by Gruenwald fails to teach that the notch is partially filled with an optically transparent adhesive. Reedy teaches that a notch is partially filled with an optically transparent adhesive in order to immobilize the fiber while minimizing light losses caused by reflection or absorption at interfaces (column 15, lines 20-32).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the integrated circuit of Tran as modified by Gruenwald with the optically transparent adhesive of Reedy for the benefit of immobilizing the fiber while minimizing light losses caused by reflection or absorption at interfaces.

With respect to claim 187, Tran as modified by Gruenwald teaches all of the limitations of claim 186 above.

Tran as modified by Gruenwald fails to teach that the optical adhesive has a refractive index that is substantially similar to that of the core region of the optical fiber. Reedy teaches that an optical adhesive has a refractive index that is substantially similar to that of the core region of the optical fiber in order to minimize light losses caused by reflection or absorption at interfaces (column 15, lines 20-27).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the integrated circuit of Tran as modified by Gruenwald with the optical adhesive of Reedy for the benefit of minimizing light losses caused by reflection or absorption at interfaces.

With respect to claim 188, Tran as modified by Gruenwald teaches all of the limitations of claim 173 above.

Tran as modified by Gruenwald fails to teach that said notch is filled with epoxy; wherein the epoxy has a refractive index that is substantially similar to that of the core region of the optical fiber. Reedy teaches that an opening is filled with epoxy; wherein the epoxy has a refractive index that is substantially similar to that of the core region of the optical fiber in order to immobilize the fiber while minimizing light losses caused by reflection or absorption at interfaces (column 15, lines 20-32).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the integrated circuit of Tran as modified by Gruenwald with the epoxy of Reedy for the benefit of immobilizing the fiber while minimizing light losses caused by reflection or absorption at interfaces.

With respect to claim 189, Tran as modified by Gruenwald teaches all of the limitations of claim 175 above.

Tran as modified by Gruenwald fails to teach that the semiconductor substrate comprises a first layer and a second layer, the first layer adjacent to the first surface; and wherein the optoelectronic device is configured to operate with light of substantially a wavelength spectrum and the first layer is transparent for light of substantially the wavelength spectrum. Reedy (e.g.

Figures 1 and 2) teaches that a semiconductor substrate comprises a first layer and a second layer, the first layer adjacent to the first surface; and wherein the optoelectronic device is configured to operate with light of substantially a wavelength spectrum and the first layer is transparent for light of substantially the wavelength spectrum in order to reduce the parasitic capacitance between charged active regions and the substrate and to eliminate leakage currents flowing between adjacent active devices (column 5, lines 54-61).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the integrated circuit of Tran as modified by Gruenwald with the semiconductor substrate of Reedy having a first layer and a second layer for the benefit of reducing the parasitic capacitance between charged active regions and the substrate and eliminating leakage currents flowing between adjacent active devices.

With respect to claim 190, Tran teaches that the electrical circuitry has electronic components and optical waveguides (column 4, lines 56-60).

With respect to claim 191, Gruenwald teaches that the electrical circuitry comprises electrical signal processing circuitry (column 4, lines 10-19).

9. Claim 197 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tran in view of Gruenwald.

With respect to claim 197, Tran teaches all of the limitations of claim 196 above. Tran (e.g. Figure 7) further teaches that the optical reflector assembly couples light 96 incident within the notch with the optoelectronic device (column 10, lines 32-38).

Tran fails to teach that the optical reflector assembly is formed from a substrate. Gruenwald teaches that an optical reflector assembly is formed from a substrate (Pyrex glass body) (column 5, lines 35-39) in order to provide a method for economical production of optical high-frequency transmitting and receiving modules (column 2, lines 9-12 and 52-56) by providing a desired mirror contour and inclination (column 5, lines 20-45).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the integrated circuit of Tran with the optical reflector assembly of Gruenwald formed from a substrate for the benefit of providing a method for economical production of optical high-frequency transmitting and receiving modules by providing a desired mirror contour and inclination.

10. Claim 199 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tran in view of Reedy.

With respect to claim 199, Tran teaches all of the limitations of claim 196 above.

Tran fails to teach that the notch is at least partially filled with an optically transparent adhesive. Reedy teaches that a notch is partially filled with an optically transparent adhesive in order to immobilize the fiber while minimizing light losses caused by reflection or absorption at interfaces (column 15, lines 20-32).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the integrated circuit of Tran with the optically transparent adhesive of Reedy for the benefit of immobilizing the fiber while minimizing light losses caused by reflection or absorption at interfaces.

Response to Arguments

11. Applicant's arguments with respect to claims 173, 197, and their dependencies have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to W. Wendy Kuo whose telephone number is (571)270-1859. The examiner can normally be reached Monday through Friday 7:00 AM to 4:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sue A. Purvis can be reached on (571) 272-1236. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

WWK
08/09

/Minh-Loan T. Tran/
Primary Examiner
Art Unit 2826